

WHAT IS CLAIMED IS:

1. An electromagnetic actuator comprising:
a stationary member having a first core section carrying a first coil wound around its periphery;
5 a movable member magnetically coupled with said stationary member with a gap therebetween and having a second core section carrying a second coil wound around its periphery;
a support member for displaceably supporting said
10 movable member relative to said stationary member; and
an electric current source for displacing said movable member relative to said stationary member by supplying electricity to said first and second coils.
- 15 2. An electromagnetic actuator according to claim 1, wherein
said first coil and said second coil are electrically connected to each other and electrically energized by a single electric current source.
- 20 3. An electromagnetic actuator according to claim 1, wherein
said first coil and said second coil are wound respectively around said first and second core sections
25 in such a way that the oppositely disposed parts of the stationary member and the movable member show opposite magnetic poles.

4. An electromagnetic actuator according to claim
1, wherein

said first coil and said second coil are wound
respectively around said first and second core sections
5 in such a way that the oppositely disposed parts of the
stationary member and the movable member show same
magnetic poles.

5. An electromagnetic actuator according to claim
10 1, wherein

the oppositely disposed parts of the stationary
member and the movable member are toothed like combs
and the corresponding toothed parts are interdigitally
arranged with a gap separating them.

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6. An electromagnetic actuator according to claim
1, further comprising:

a substrate carrying thereon said stationary
member rigidly secured thereto, said support member
20 comprising a spring displaceably supporting said
movable member relative to said substrate.

7. An electromagnetic actuator according to claim
6, wherein

25 said spring comprises a pair of hinged springs,
each being rigidly secured to said substrate at an end
thereof and to said movable member at the other end

thereof.

8. An optical scanner comprising:

an electromagnetic actuator according to any of
5 claims 1 through 7 above; and

a mirror arranged on the movable member of said
electromagnetic actuator.

9. An optical scanner comprising:

10 an electromagnetic actuator according to any of
claims 1 through 7 above; and

a lens arranged on the movable member of said
electromagnetic actuator.

15 10. A method of preparing an electromagnetic
actuator comprising a stationary member having a first
core section carrying a first coil wound around its
periphery, a movable member magnetically coupled with
said stationary member with a gap therebetween and
20 having a second core section carrying a second coil
wound around its periphery and a support member for
displaceably supporting said movable member relative to
said stationary member, said method comprising steps
of:

25 forming said stationary member, said movable
member and said support member on a single substrate by
means of photolithography and plating; and

removing the substrate from under the movable member so as to make the movable member to be supported by the substrate by way of the support member.

5 11. A method of preparing an electromagnetic actuator according to claim 10, wherein
said substrate is a silicon substrate.

10 12. A method of preparing an electromagnetic actuator according to claim 11, wherein
said step of removing the substrate is a step of anisotropically etching the silicon substrate from the rear surface thereof.